

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

REC'D 28 MAY 2004
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Applicant's or agent's file reference 2002P11366WO/P72/CF	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB 03/02719	International filing date (day/month/year) 26.06.2003	Priority date (day/month/year) 19.07.2002
International Patent Classification (IPC) or both national classification and IPC E04B1/84, E04B1/84		
Applicant OXFORD MAGNET TECHNOLOGY LTD et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.
 - This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
 - I Basis of the opinion
 - II Priority
 - III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV Lack of unity of invention
 - V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI Certain documents cited
 - VII Certain defects in the international application
 - VIII Certain observations on the international application

Date of submission of the demand 13.01.2004	Date of completion of this report 27.05.2004
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International application No. PCT/GB 03/02719

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-14 as originally filed

Claims, Numbers

3 (part), 4-9 as originally filed
1-2, 3 (part) received on 27.04.2004 with letter of 23.04.2004

Drawings, Sheets

1/10-10/10 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

the entire international application,

claims Nos. 1-7

because:

the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 8,9 are so unclear that no meaningful opinion could be formed (*specify*):

see separate sheet

the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

the written form has not been furnished or does not comply with the Standard.

the computer readable form has not been furnished or does not comply with the Standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-7
No: Claims

Inventive step (IS) Yes: Claims 1-7
No: Claims

Industrial applicability (IA) Yes: Claims 1-7
No: Claims

2. Citations and explanations

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Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

3.1 Claims 8 and 9.

For the reasons referred to under Item 6.2, no such opinion can be established in respect of said claims.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:

D1: EP-A-0 323 612.

5.1 Independent Claim 1.

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

- a composite material for acoustic or mechanical damping, comprising a plurality of layers of fibrous material (1,2) embedded in a solid material (3,4,5) having a composition which varies through a depth of the material, the composition having a relatively high proportion of a first material, being a structural composite resin (claim 1, lines 46,47), and a relatively low proportion of a second material (the material of the "interleaf layer" - cf. claim 1, lines 48-51), being a material of high hysteretic loss (owing to its inherent ductility - cf. page 5, lines 4-6), at the outer surfaces of the material, and the composition having a damping region ("interleaf layer") between the outer surfaces wherein the composition has a relatively high proportion of the second material and a relatively low proportion of the first material, the composition of the solid material varying through a gradual change in composition between the damping region and the outer surfaces, such that the material contains no abrupt changes in composition (owing to the interleaf layer comprising at least one thermoplastic resin co-crystallisable or co-vitrifiable with the binder resin of the structural composite resin - (cf. claim 1, particularly line 49).

The subject-matter of claim 1 differs from this known material in that:

- the composite material comprises layers of fibrous material impregnated with a

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material of hysteretic loss (14) between layers of fibrous material impregnated with a structural composite resin (26,28).

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to avoid shearing between layers.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT), as none of the prior art documents at hand render the incorporation of a layer of fibrous material in the interleaf layer of D1 obvious.

5.2 Independent Claim 3.

Independent Claim 3 concerns a method of producing a composite material, whereby the features of claim 1 result from said method.

The subject-matter of claim 1 is therefore likewise new (Article 33(2) PCT) and involves an inventive step (Article 33(3) PCT),

5.3 Dependent Claims 2 and 4-7.

Claim 2 and 4-7 are dependent on claims 1 and 3 respectively and as such also meet the requirements of the PCT with respect to novelty and inventive step.

6. Further Comments.

6.1 Prior Art.

Document D1 has not been identified in the description nor has the relevant background art disclosed therein been discussed (Rule 5.1(a)(ii) PCT).

6.2 Clarity, Claims 8 and 9.

Said claims rely, in respect of the technical features of the invention, on references to the description or drawings and therefore contravene Rule 6.2(a), PCT.

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CLAIMS:

1. A composite material (10) for acoustic or mechanical damping, comprising: a plurality of layers of fibrous material (12) embedded in a solid material 5 (14, 24), characterised in that the composite material comprises layers of fibrous material impregnated with a material of hysteretic loss (14), between layers of fibrous material impregnated with a structural composite resin (26, 28); and in that the solid material has a composition which varies through a depth of the material, the composition having a relatively high proportion of a first material, being the structural 10 composite resin, and a relatively low proportion of a second material, being the material of high hysteretic loss, at the outer surfaces of the material, and the composition having a damping region between the outer surfaces wherein the composition has a relatively high proportion of the second material and a relatively low proportion of the first material, the composition, the composition of the solid material 15 varying through a gradual change in composition between the damping region and the outer surfaces, such that the material contains no abrupt changes in composition.

2. A material according to claim 1 wherein the first material is an epoxy or polyester resin, the second material is polyurethane and the fibrous material is glass 20 fibre matting.

3. A method for producing a composite material for acoustic or mechanical damping, comprising the steps of:
- providing at least one first fibrous layer impregnated with a first thermosetting 25 material;
- stacking the at least one first fibrous layer on a former;
- providing at least one second fibrous layer impregnated with a second thermosetting material;
- stacking the at least one second fibrous layer on the stack of the first fibrous layer(s);
30 - providing at least one third fibrous layer impregnated with a third thermosetting material;

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More particularly, the present invention provides a composite material for acoustic or mechanical damping, comprising: a plurality of layers of fibrous material embedded in a solid material. The composite material comprises layers of fibrous material impregnated with a material of hysteretic loss, between layers of fibrous material 5 impregnated with a structural composite resin. The solid material has a composition which varies through a depth of the material, the composition having a relatively high proportion of a first material, being a structural composite resin, and a relatively low proportion of a second material, being a material of high hysteretic loss, at the outer surfaces of the material, and the composition having a damping region between the 10 outer surfaces wherein the composition has a relatively high proportion of the second material and a relatively low proportion of the first material, the composition, the composition of the solid material varying through a gradual change in composition between the damping region and the outer surfaces, such that the material contains no abrupt changes in composition.

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The first material may be an epoxy or polyester resin. The second material may be polyurethane. The fibrous material may be glass fibre matting.

The present invention also provides a method for producing a composite material for 20 acoustic damping, comprising the steps of:

- providing at least one first fibrous layer impregnated with a first thermosetting material;
 - stacking the at least one first fibrous layer on a former;
 - providing at least one second fibrous layer impregnated with a second thermosetting material;
- 25 - stacking the at least one second fibrous layer on the stack of the first fibrous layer(s);
- providing at least one third fibrous layer impregnated with a third thermosetting material;
 - stacking the at least one third fibrous layer on the stack of first and second fibrous layers; and
- 30 - simultaneously heating and compressing the resulting stack of first, second and third fibrous layers to harden the thermosetting materials,